

REMARKS

Summary of Changes Made

The application was originally filed with claims 1-14. No claims have been canceled, new claims 15 and 16 have been added, and claims 1-9 and 11-14 have been amended herein. Accordingly, claims 1-16 remain pending in the application. The Examiner will note that a Terminal Disclaimer with respect to Application No. 10/533,837 is filed herewith, thus removing the basis of the double patenting rejection, below. No new matter is added herein.

Claim Rejections – 35 U.S.C. 112, second paragraph

The Examiner rejected claims 1-14 under 35 U.S.C. 112, second paragraph, as being indefinite. The Examiner believes, based on the International Preliminary Examination Report (IPER) of the corresponding PCT application, that although V^1 and V^2 do have structural limitations attached to them, there is no indication in the claims that V^1 and V^2 are necessarily separated from one another by a unit Q thus making their assignment for the purposes of determining whether or not the ratio V^2/V^1 is less than 1:3 virtually impossible. The problem is exacerbated by the fact that, midway through claim 1, V is said to represent, “at least one group V^1 and at least one group V^2 .”

The Examiner's proceeds from the belief that V^1 and V^2 are not bonded to one another but, the Examiner notes that the claims do not currently require this.

First, the Examiner will note that claim 1 has been amended to recite that “V includes at least one group V^1 and at least one group V^2 .” This represents no new matter, and is a clarification only. For added clarity, claim 1 has also been amended to recite “[l]inear polyamino-polysiloxane and/or polyammonium-polysiloxane copolymers.” Claims 2-9 and 11-14 have been similarly amended, and new claims 15 and 16 include such language.

The Examiner's instincts are correct in presuming that V^1 and V^2 must be separated by Q. Indeed, the disclosure of the overall formula $-[Q-V]-$ indicates that any two V units must be separated by a Q unit. The skilled artisan will immediately appreciate that the invention relates to linear polyamino-polysiloxane and/or polyammonium-polysiloxane copolymers containing the repeating units $-[Q-V]-$, wherein V is selected from V^1 and V^2 , and wherein the ratio of $V^2/V^1 < 1:3$. It is unclear to the Examiner that a Q unit must be between any two V units. However, the formula makes it clear that this must be the case. The skilled artisan recognizes that the formula written in brackets represents the simplest manifestation of the

repeating unit. It could instead be written $-\text{[Q-V-Q-V]}-$, which would unequivocally indicate that each V unit is separated by a Q unit.

Applicants believe that the foregoing makes clear that the inventive copolymer includes Q and V units such that each pair of V units is separated by a Q unit.

Claim Rejections – 35 U.S.C. 101

Claims 11 and 12 stand rejected under 35 U.S.C. 101, as failing to recite statutory subject matter. The Examiner admits that the claims provide for the use of a copolymer, but, since the claims do not set forth any steps involved in the process, it is unclear what process applicant is intending to encompass.

The Examiner will note that claims 11 and 12 have been amended to recite active process steps. Further, new claims 15 and 16 have been added to set forth processes of washing laundry (claim 15) and treating a substrate (claim 16), thus capturing subject matter removed from claims 11 and 13.

Applicants respectfully submit that claims 11 and 12 are now directed to statutory subject matter and request withdrawal of the rejection.

Claim Rejections – 35 U.S.C. 103(a) – (Zhang)

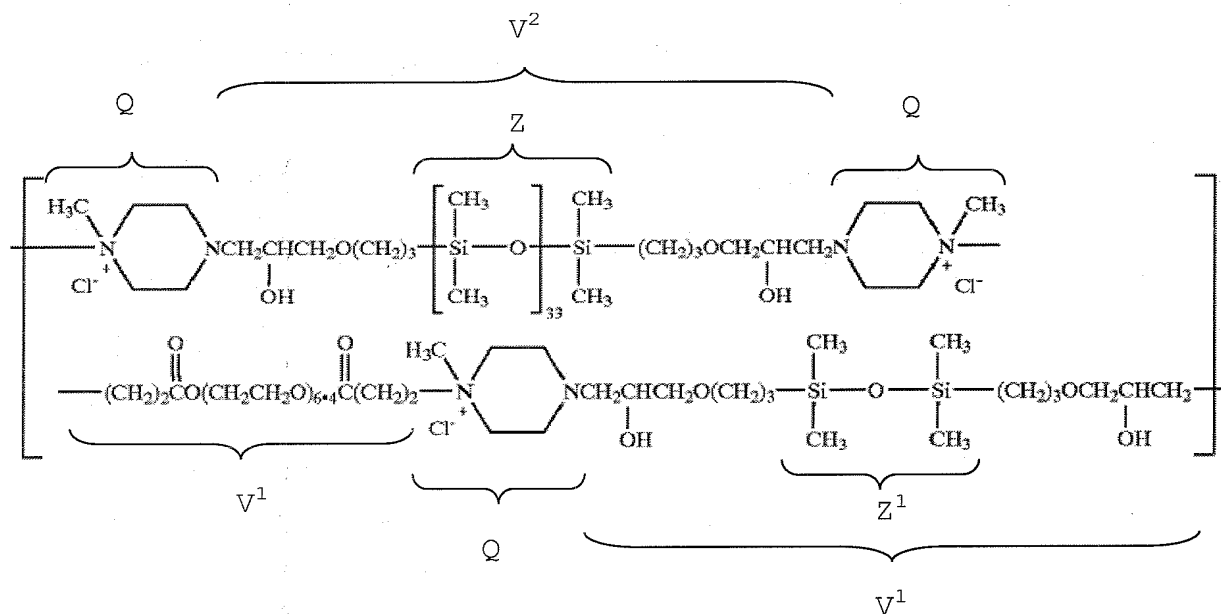
Claims 1-7 and 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang, et al., U.S. Pat. No. 6,818,610, (“Zhang”). The Examiner admits that Zhang fails to expressly disclose a polymer adhering to the V^2/V^1 ratio, the closest embodiment being that outlined in Example 3 wherein said ratio is alleged to be precisely 1:3. Nevertheless, the Examiner believes that the claimed invention is at least obvious insofar as (i) no criticality for this limitation is demonstrated by Applicant's Specification and (ii) the lack of any limits on the relative molar quantities of the epoxy-functional monomer, amine-functional monomer, and haloalkyl-functional monomers stipulated by the prior art.

The Examiner further notes that, there is nothing prohibiting an -O- group and a -C(=O)- group from being adjacent to one another in V^1 and V^2 .

The Examiner begins by admitting that this reference does not expressly disclose a polymer having a V^2/V^1 ratio of less than 1:3, but he refers to Example 3, wherein said ratio is alleged to be precisely 1:3. Applicants note that the formula presented as the product of

Example 3, occupying lines 15-30 of columns 15 and 16, does not have a ratio of V^2/V^1 of 1:3. In fact, the formula shown gives a ratio of 1:2, as noted below.

The formula shown in columns 15 and 16 is as follows:



According to such formula the ratio of the long chain polydiorganosiloxane unit V^2 to the short chain polydiorganosiloxane unit V^1 , containing Z^1 , V^2/V^1 would be 1/2 and not 1/3.

Applicants further point out that Zhang as a whole appears to be full of errors in the disclosure starting, for example, with the general formula:



wherein each Z unit independently has the formula:



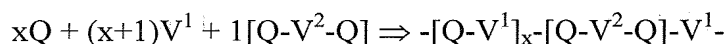
which would mean for example that two R units would be adjacent to one another. It is not possible to subsume the formula of example 3 under this general formula, nor is it possible to

derive the present invention from this general formula in Zhang.

Moreover, the process disclosed in Zhang does not allow the manufacture of $-\text{[Q-V]}-$ copolymers where V^2/V^1 is less than $1/3$. That is, Example 3 reacts equimolar amounts of diaminosiloxanes $[\text{Q-V-Q}]$ with dihalogenalkyl esters (V^1), which in general leads to quaternized $[\text{Q-V}]$ -polymers, having alternating units Q and V. Achieving a V^2/V^1 ratio of less than $1/3$ as in the present invention would require that more Q-units are used in the reaction with the aminosiloxanes $[\text{Q-V-Q}]$ and the V^1 units, in order to reduce the V^2/V^1 ratio, a feature that forms the focus of the present invention and that is neither disclosed nor suggested by Zhang.

Example 2b of the present invention (page 40), makes it evident that the N-methylpiperazine-modified siloxane of example 2a – which is a single Q unit (N-methylpiperazine) reacted with the quaternizing agent corresponding to V^1 (chloroacetic acid ester of example 1b) serves to introduce V^2 . Only this measure, that is, the use of an amine that introduces a single Q-unit, allows the introduction of a higher percentage of V^1 units, because for each single Q unit one V^1 unit is introduced.

For example:



From this it is evident that the use of single Q units allows a relative increase of V^1 units, which in turn decreases the V^2/V^1 ratio to less than $1:3$ by setting x to be more than 2.

This is critical because the present invention allows the construction of copolymers that have a high ratio of positively charged Q units relative to the long chain polysiloxane units. In other words, the process of the invention allows the increase of the proportion of quaternary ammonium groups per formula weight without increasing the proportion of the long chain polysiloxane units. The latter is a result of the conventional (prior art) process of reacting difunctional aminosiloxanes with difunctional quaternizing agents as disclosed in Zhang. Due to the increased proportion of quaternary ammonium groups hydrophilicity of the aminosiloxane copolymers can be substantially increased without impairing the softening properties.

Applicants have discovered that it is possible to extend the scope of available aminosiloxane copolymers or the available properties of such aminosiloxane copolymers beyond that of the prior art, thereby allowing the provision of hydrophilic aminosiloxane copolymers with high substantivity (that is, high adherence to substrates) which can be tailored to a specific application by varying the V^2/V^1 ratio. The long chain polydiorganosiloxane unit (V^2) is responsible for the provision of softening properties to substrates. The V^1 unit, on the other hand, corresponds to the number of Q units, and is thereby responsible for an increased charge density of the copolymers leading to higher substantivity and hydrophilicity.

Applicants note that claim 8 is not covered by any prior art rejection. Based on the foregoing, Applicants respectfully request withdrawal of the rejection of claims 1-7 and 9-14.

Claim Rejections – Double Patenting

Finally, the Examiner provisionally rejects claims 1-5 and 7-14 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-11 of commonly owned copending Application No. 10/533,837. The Examiner contends that there is substantial overlap between the inventions where the moiety Q of the copending claims comprises an ammonium-containing residue. The Examiner admits that one distinction between them is that the co-pending claims stipulate that the radicals V^1 are devoid of ester groups. However, in the Examiner's opinion, the instant claims, insofar as they are silent as to the presence or absence of ester groups, embrace both permutations.

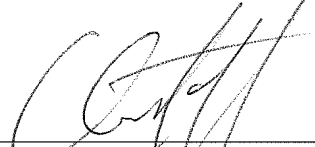
The Examiner will note that a Terminal Disclaimer with respect to Application No. 10/533,837 is filed herewith, thus removing the basis of the rejection.

CONCLUSION

Based on the foregoing, the Applicants respectfully request entry of the instant amendment and a Notice of Allowability for claims 1-16. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application. If there are any additional fees resulting from this communication, please charge the same to our Deposit Account No. 18-0160, our Order No. GIL-16073.

Respectfully submitted,

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